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Vehicle braking system with antilocking braking regulation - uses dynamic regulation and adaptive predictive regulation succession

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Number of Countries: 007 Number of Patents: 007

Patent Family:

Patent No	Kind	Date	Applicat No	Kind	Date	Week	
EP 445575	A	19910911	EP 91102378	A	19910220	199137	B
DE 4007360	A	19910912	DE 4007360	A	19900308	199138	
DE 4007360	C	19911205				199149	
US 5163742	A	19921117	US 91666617	A	19910308	199249	
EP 445575	A3	19930526	EP 91102378	A	19910220	199403	
EP 445575	B1	19950621	EP 91102378	A	19910220	199529	
DE 59105750	G	19950727	DE 505750	A	19910220	199535	
			EP 91102378	A	19910220		

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Cited Patents: NoSR.Pub; DE 3829951; EP 173954

Patent Details:

Patent No	Kind	Lan	Pg	Main IPC	Filing Notes
EP 445575	A				
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US 5163742	A		16	B60T-008/60	
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DE 59105750	G			B60T-008/26	Based on patent EP 445575

Abstract (Basic): EP 445575 A

The braking system uses electrically controlled brake pressure valve operated in response to the detection rotation rates of the braked wheels. The braking regulation is effected by initial dynamic regulation dependent on the detected rotation differences between the braked wheels, followed by a second regulation step using adaptive predictive pre-control of the brake pressure distribution to the braked wheels.

Pref. the braking is defined by a braking distribution function with parameter values determined from the wheel rotation characteristics upon initial brake operation.

ADVANTAGE - Optimal use of overall braking capacity. (18pp Dwg.No.1/4)

Abstract (Equivalent): EP 445575 B

The braking system uses electrically controlled brake pressure valve operated in response to the detection rotation rates of the braked wheels. The braking regulation is effected by initial dynamic regulation dependent on the detected rotation differences between the braked wheels, followed by a second regulation step using adaptive predictive pre-control of the brake pressure distribution to the braked wheels.

Pref. the braking is defined by a braking distribution function with parameter values determined from the wheel rotation characteristics upon initial brake operation.

ADVANTAGE - Optimal use of overall braking capacity. (18pp

Dwg.No.1/4)

EP-445575 Method of distributing brake pressure to the axles of a motor vehicle with an ABS pressure-medium brake, the vehicle being equipped with an electrically acting anti-lock brake system (ABS), known per se, with electronic centralised control and electrically controllable brake valves near to the axles and comprising speed sensors which are assigned to the brakable wheels and serve as actual-value sensors of the instantaneous wheel speed for an ABS control which is operative at a wheel brake pressure near to the wheel lock limit, and the inter-axle brake-pressure distribution phi = p front/p rear being regulated automatically in a slip range below the range in which the ABS function is operative in accordance with an evaluation of the wheel-speed signals supplied by the wheel-speed sensors, and the exceeding of a first predeterminable limiting value ds1 by a referred difference ds of inter-axle wheel speeds upon braking serving as the condition for a first regulation of said brake-pressure distribution phi, characterised in that - when the limiting value ds1 is exceeded, for intervention in individual brake applications the said first regulation is, in a first step, performed dynamically in the sense of a continuously cyclic acquisition and processing of current actual wheel-speed differences for the purpose of immediate influencing of the brake-pressure distribution phi while the respective braking operation is still underway and - in a second step, a second regulation in the manner of an adaptively predictive precontrol of the brake-pressure distribution phi for any retardation levels is made the basis of this first regulation, using the following further method steps: (a) mutually associated steady-state values of the referred inter-axle speed difference ds and of the retardation Z in the case of the old brake-pressure distribution phi - p front/p rear are sought on the basis of predetermined limiting values for the time rate of change of these variables; (b) as soon as steady-state values ds, Z are present, then, after at least one initial brake application, the parameters a and b of a brake-pressure distribution function phi - a + b*z setpoint are determined, in which function Z setpoint is the setpoint deceleration demanded by the driver via the brake pedal; (c) this brake-pressure distribution phi is taken as the basis for the subsequent braking operations; (d) as soon as, after the determination of a and b in the course of a subsequent brake application, a second, smaller limiting value ds2 is exceeded by a steady-state value ds m of the referred speed difference, the old value of phi is corrected to the new value phi D by means of the said first regulation in the current cycle.

(Dwg.1/4)

Abstract (Equivalent): US 5163742 A

The brake pressure and, the brake-force distribution are regulated axle-specifically far below the wheel lock limit too. An immediate dynamic intervention is, on one hand, effected in the case of sufficiently large wheel-speed differences between the axles. On the other hand, an adaptive predetermination of correct brake-force distributions is made the basis for each current regulating intervention.

Even before the occurrence of large speed differences, the brake-force distribution expedient in each case for these is here predictively determined, stored, and, if required, correspondingly adapted to current requirements, i.e. corrected, in the course of subsequent dynamic braking demands. Requisite determination parameters are obtained for each journey either via characteristic diagrams

specific to the family of vehicles or are determined individually on the individual vehicle by a learning approximation routine.

ADVANTAGE - Automatically self-optimising inter-axle brake-pressure distribution acting far below wheel lock limit is achieved.

Dwg.1/4

Title Terms: VEHICLE; BRAKE; SYSTEM; ANTILOCK; BRAKE; REGULATE; DYNAMIC; REGULATE; ADAPT; PREDICT; REGULATE; SUCCESSION

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